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About restrictions on maximum velocity in inverse boundary-value problems of aerohydrodynamics

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Abstract

A number of formulations and methods were proposed to solve variational inverse boundary-value problems of aerohydrodynamics (IBPA). These problems were solved within the framework of the classical models of the mechanics of fluids and gases for the isoperimetrical restrictions and separation-free flow. The highest value of lift coefficient Cy was estimated in the class of the closed impenetrable fixed-perimeter contours smoothly flowed around by a stream of ideal incompressible fluid (IIF). The exact solutions of the basic variational IBPA within the framework of the IIF model and the Chaplygin gas model in subsonic flow around were constructed. It was also necessary to find the shape of an isolated impenetrable wing profile within the framework of the selected mathematical flow model from the flow-velocity distribution set on its contour when solving the basic IBPA.

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